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DIETS FOR EXPECTANT AND NURSING MOTHERS

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DISCUSSION *by Lyle G. McNeile, M. D., Los Angeles; Titian Coffey, M. D., Los Angeles; Frank W. Lynch, M. D., San Francisco.*

MY interest in the diets of expectant and nursing mothers was aroused many years ago when as a specialist I was caring for a diabetic girl whose mother was again pregnant. There were three healthy little girls in the family and the father naturally desired a son. In her previous pregnancies the mother had had more than her share of troubles. There was always nausea and vomiting in the beginning and a marked tendency toward overweight at term. All of the children had been bottle babies with their usual wakeful nights. The mother continually took cathartics as she had always done. I stopped these and managed her bowels with ample amounts of fruits and vegetables. She was able to take a proper amount of exercise and, by reducing the fat and including ample amounts of sugars and starches in the diet, I had no difficulty in managing her weight. She took no cathartics even through her confinement. After the baby came I gave her an extra quart of milk each day. She was able to nurse this baby and in fact had difficulty when weaning time came. This baby caused a minimum amount of care. It was another girl.

I am sometimes called to assist in the routine care of pregnant women but, as an internist, I am more frequently called in if something has gone wrong, when I generally find that these women have violated some of the diet laws that most individuals violate today.

FUNDAMENTAL PRINCIPLES IN ALL DIETS

There are certain fundamental principles which apply to all diets. Healthy individuals must eat ample quantities of certain foods if they wish to remain well, and the basic principles must not be violated even when illness demands special foods. It will be the purpose of this paper to review these laws and to stress the ones most commonly violated. Regardless of their relative importance, we seem to do the most good to the greatest number by discussing them in the following order.

THE DIET SHOUD CONTAIN AMPLE BULKY OR RESIDUE-CONTAINING FOODS

The residue-containing foods are the fruits, vegetables, and the whole-grain products. A lack of such foods results in constipation, which is usually alleviated by irritating cathartics or enemas, with resultant bowel distress. Most patients do not understand that the rate of residue movement through the alimentary tract is in the neighborhood of seventy-two hours; that is, the residue from the foods eaten today makes a normal bowel movement on the fourth day. Most patients do not appreciate that a drastic cathartic empties the alimentary tract completely, producing one or more loose stools, and that following such a procedure a natural stool should not be expected until the fourth day, provided the individual is eating normally. Normal individuals require an average of two pounds of residue-containing foods per day. Patients are advised to buy postal scales and weigh such foods. These foods should be weighed as eaten. For example, if apples are eaten raw, they should be weighed raw, or if eaten cooked, they should be weighed cooked. We find that apples, bananas, dates, figs, and raisins are especially efficacious. Constipation is a very common ailment, but the pregnant woman seems to have more than the usual amount of difficulty. She may need more than the usual amount of bulky foods, but I have never yet failed to obtain results with such a patient. Nursing mothers should be especially careful not to take cathartics.

THE DIET SHOULD CONTAIN AMPLE ALKALINE FOODS

The alkaline foods are the fruits, vegetables, nuts, and milk. We usually speak of them as foods containing the soda-like compounds. These foods have an alkaline ash and are used to neutralize the acid ash of such good foods as cereals, breads, meat, eggs, fowl, fish, and shellfish. A lack of the alkaline foods results in one form of acidosis which can best be measured by the acidity of the urine. The urine is usually acid, but there is no agreement as to how acid it should be. I believe that the reaction of the urine should be close to the neutral point or not more than two times as acid as the body.* I believe that urines

* From the Potter Metabolic Clinic, the Santa Barbara Cottage Hospital, Santa Barbara.

* Read before the Obstetrics and Gynecology Section, California Medical Association, at its Fifty-Sixth Annual Session, April 25-28, 1927.

* A neutral urine has a hydrogen ion concentration 2.2 times as great as that of normal blood, hence is 2.2 times as acid.

which are from one hundred to one thousand times as acid as the body are far too acid, and yet such urines are common. Other symptoms of this type of acidosis are headaches, sour mouth, sour stomach, often associated with gas and "biliousness," sour sweat, "sour disposition" and, most serious of all if this acidosis is permitted to exist for a sufficient length of time, serious blood-vessel disease with high blood pressure, impairment of vision and gangrene, which may terminate fatally in apoplexy, heart or kidney disease. Usually patients who are constipated have high blood pressure eventually, not because constipation is the cause of high blood pressure, but because both diseases have a common source in the lack of sufficient fruits and vegetables.

A beginning high blood pressure with or without traces of albumin in the urine is oftentimes seen during pregnancy. This, of course, may be due to an accident incident to the pregnancy itself. Foci of infection in tonsils, teeth or nasal sinuses must always be sought and removed when possible, since they must be considered as an important etiological factor in all cases of high blood pressure and nephritis in young people. Whatever the cause, I usually advise a basic diet. The following case history illustrates many important points in this connection.

Mrs. J., aged 24, entered the hospital on November 1, 1926, complaining of high blood pressure, headaches, nausea, vomiting, neuritis, fever, constipation, and loss of weight. She had one child 2½ years of age. During this pregnancy she had had an unusually difficult time with nausea, vomiting, high blood pressure, and albumin in the urine. At term a Cesarean section was done because she was in such a weakened condition. After the birth of this child she was kept in bed for nearly one year. The remainder of her history was essentially negative except for diphtheria as a child and a tonsillectomy at 15 years of age.

On admission we found a blood pressure of 172 systolic and 90 diastolic; an extensive neuritis; an afternoon temperature of 99 degrees F.; a very serious cathartic colitis (she had been taking cathartics for nine years, and since the baby came she had been taking each night either six ounces of milk of magnesia or four teaspoonfuls of castor oil); hemoglobin, 75 per cent (Dare); red blood cells, 4,400,000; white blood cells, 8500; and a one plus albumin in the urine.

Such blood pressures in young people are often due to infection which in this instance was found in the nasal sinuses. There was a bilateral frontal sinusitis, a bilateral ethmoidal and maxillary sinusitis and an empyema of the right sphenoid. Treatment of her nasal sinus condition immediately reduced her temperature to normal. Ample amounts of fruits and vegetables, cooked at first, soon cured her constipation and colitis. At the present time she is essentially well, has gained up to a normal weight and her blood pressure is 135 systolic. It seems to me that chronic sinus disease may very well have been the cause of the difficulty during her pregnancy, as it certainly was when I saw her.

THE DIET SHOULD CONTAIN AMPLE SUGARS AND STARCHES AND LESS OF THE FATS

There is an erroneous idea that sugar is not a good food; yet there is increasing evidence to show that all foods, even the fats, are eventually changed into sugar before they are finally burned by the body. There has been a constant increase in fat consumption. A lack of sufficient sugar associated with the overconsumption of fat produces the acetone or diabetic type of acidosis which is commonly seen in starvation, semistarvation, as a serious and often fatal complication during the diseases of childhood, during pregnancy, after surgical operations, and, most commonly of all, in fat people who wrongly attempt to reduce by the elimination of the starches and sugars from their diets. A feeling of sluggishness, the presence of acetone on the breath or in the urine, nausea and vomiting, are the more common early symptoms of this type of acidosis. In the early months of pregnancy the enlarging of the uterus often causes a reflex type of vomiting. This does not become alarming unless it robs the prospective mother of the ability to take and retain sufficient carbohydrate food to prevent the onset of acidosis. When acidosis occurs, however, the reflex vomiting may be aggravated beyond control, and a vicious circle is established. The worse the acidosis the worse the vomiting, and the worse the vomiting the worse the acidosis. If this occurs, and especially if the patient is seen early, I usually use the sour fruit juices sweetened with sugar. The sour fruit juices will be retained when other food will not. If the patient cannot retain any liquid, pieces of lemon dipped in sugar may be given. Glucose may also be given by rectum or intravenously. Small doses of insulin, 20 to 40 units given hypodermically, assist so promptly and efficaciously in this type of vomiting that one might assume that the acidosis might be due to a lack of insulin from toxic causes. I now believe that insulin is more or less concerned in the burning of fat and hence it may be given without sugar when necessary. The following case history illustrates the use of insulin:

Mrs. D., aged 22, entered the hospital September 21, 1926, and was referred to me by Dr. H. L. Schurmeier on September 24. On admission there was nausea, vomiting and backache, which had been growing worse for five days. She was approximately six weeks pregnant. Her urine contained large amounts of acetone and diacetic acid, but no sugar. Her temperature was 99.8 degrees F. On admission all foods and fluids by mouth were stopped and the stomach was washed with a weak sodium bicarbonate solution. Four ounce retention enemas containing 10 per cent glucose, 2 per cent sodium bicarbonate, and 40 grains of sodium bromid were ordered each four hours. Corpus luteum was also given. The enemas were not retained well, the vomiting and acetonuria were even more marked when I saw her on the 24th. I gave her 20 units of insulin at 11 a. m. and 50 units at 2:45 p. m. At 5 p. m. all tendency toward nausea and vomiting had stopped and she had a slight insulin reaction beginning with a sense of well-being as if her toxicity had gone, extreme hunger, and slight perspiration. The urine contained no acetone. We gave her a glass of milk and at supper time practically a full tray which she retained with no difficulty. The next morning she had a full breakfast with 40 units of insulin, and the full tray was continued. She left the hospital the next morning.

THE DIET SHOULD CONTAIN AMPLE CALORIES

Two thousand two hundred to two thousand five hundred calories should suffice. Overweight must be avoided, allowing, of course, for the weight of the gestation sac. Exercise where possible, together with a reduction of the fat rather than the carbohydrate in the diet, will control weight with-

out danger from the acetone type of acidosis mentioned above. A nursing mother in an endeavor to supply her baby with milk will often overeat of the rich, fatty foods, and drink quantities of whole milk. Her milk will have the usual low percentage of fat seen in human milk, and she will store the excess fat as body weight. Under such conditions skim milk should be used.

THE DIET SHOULD CONTAIN AMPLE PROTEIN

The proteins are the nitrogen-containing foods and are obviously essential for building up and maintaining the protein tissues of the body. I believe that one quart of milk, two eggs and one serving of meat, fish or fowl, or the equivalent, daily will be needed. The protein requirement of a nursing mother is high because she must feed herself and her baby. In addition to the normal amount of protein she should have not less than one quart of milk per day.

THE DIET SHOULD CONTAIN AMPLE MINERAL FOODS

The iron compounds are found in fruits, vegetables, egg-yolks, red meats, and the glandular organs. They are especially abundant and efficacious in liver. They are changed into hemoglobin, the red coloring matter of the blood, which carries oxygen from the lungs to the tissues.

The soda-like compounds are found in the fruits and vegetables. They carry the carbonic acid from the tissues to the lungs.

The alkaline phosphates are found in the fruits and vegetables. They are used by the kidneys to assist in maintaining the all-important alkaline balance of the body.

The calcium compounds are found in fruits, vegetables, and milk. They are used by the body to build up and maintain its bony structure and to prevent such diseases as rickets.

The sulphur compounds are found most abundantly in such vegetables as the cabbage and onion. They are used to build hair and nails.

The iodin compounds are found in the fruits, vegetables, and drinking water. The drinking water in the northern half of the United States is low in iodin. The iodin compounds are used to make the thyroid secretions.

Common salt is usually added to the food for seasoning purposes. It is used to make the soothing fluids in which the cells of the body are bathed.

THE DIET SHOULD CONTAIN AMPLE AMOUNTS OF THE VITAMINS

These vitamins, all found abundantly in fruits, vegetables, and milk, are:

Vitamin A, which prevents the form of blindness known as xerophthalmia.

Vitamin B, which prevents beriberi or peripheral neuritis.

Vitamin C, which prevents scurvy.

Vitamin D, which assists with calcium and sunlight in the prevention of rickets.

Vitamin E, which prevents sterility.

I believe that individuals who are taking a quart of milk per day together with two pounds of the fruits and vegetables so necessary for the prevention of constipation, and the supplying of an adequate amount of alkaline and mineral foods, need have no fear about vitamin deficiencies.

THE DIET SHOULD INCLUDE AMPLE WATER

Water is an excellent digestive aid. It is necessary for the elimination of sewage from the body, and by means of its evaporation a normal temperature is maintained in the body under normal and most of the abnormal conditions.

DIET MENUS

The diet menus which follow were built with all of these principles in mind. As printed they may be used for the expectant mother, but if there is any tendency toward overweight, the fat should be reduced. If there is any tendency toward high blood pressure or nephritis, milk and milk products should be freely substituted for the meat, eggs, chicken, fish and shellfish. Nursing mothers should continue with the same diets and should add at least one quart of milk, either whole or skim, to these diets. Some women do not like milk, but there is no substitute for it, and the mother usually loves her baby sufficiently to make any sacrifice necessary.

Santa Barbara Cottage Hospital.

* * *

NORMAL DIETS

1

Breakfast

Melon
Shredded Wheat with Milk and Sugar
Scrambled Eggs
Toast and Butter
Coffee with Cream and Sugar
Orange Juice

Dinner

Tomato Bisque
Roast Chicken with Dressing
Mashed Potato and Gravy
Baked Squash Buttered Celery
Pineapple and Marshmallow Salad with Whipped Cream Dressing
Bread and Butter
Chocolate Sundae Cake
Tea with Cream and Sugar

Supper

Creamed Macaroni
Spinach on Toast with Poached Egg
Baked Tomato
Bread and Butter
Assorted Fresh Fruits
Milk

Approximate composition and caloric value: carbohydrate, 300 grams; protein, 80 grams; fat, 100 grams; bulk, 800 grams; calories, 2420.

* * *

2

Breakfast

Orange Sections
Oatmeal with Milk and Sugar
Melba Toast Butter
Bacon
Coffee with Cream and Sugar
Grapefruit Juice with Lemon

Dinner

Vegetable Soup
Breaded Veal Chop Scalloped Potatoes
Creamed Cauliflower Small Peas
Tomato Salad with French Dressing
Bread and Butter
Apple Betty with Hard Sauce
Tea with Cream and Sugar

Supper

Creamed Dried Beef on Toast
Baked Potato Buttered Asparagus
Bread and Butter
Baked Apple
Milk

Approximate composition and caloric value: carbohydrate, 290 grams; protein, 90 grams; fat, 90 grams; bulk, 900 grams; calories, 2330.

* * *

3

Breakfast

Banana
Corn Flakes with Milk and Sugar
Coddled Egg
Toast and Butter
Coffee with Cream and Sugar
Orange Juice

Dinner

Cream of Celery Soup
Roast Beef Browned Potatoes
Buttered Carrots Stewed Tomatoes
Waldorf Salad
Bread and Butter
Cottage Pudding with Strawberry Sauce
Tea with Sugar

Supper

Creamed Chicken on Toast Points
Baked Sweet Potato Baby Lima Beans
Bread and Butter
Fresh Pineapple
Milk

Approximate composition and caloric value: carbohydrate, 285 grams; protein, 90 grams; fat, 90 grams; bulk, 800 grams; calories, 2310.

* * *

4

Breakfast

Apple Sauce
Cream of Wheat with Milk and Sugar
Bacon
Toast and Butter
Coffee with Cream and Sugar
Orange Juice

Dinner

Melon
Sirloin Steak Hashed Browned Potatoes
String Beans Egg Plant
Pear and Cottage Cheese Salad with French Dressing
Bread and Butter
Fruit Jello
Tea with Cream and Sugar

Supper

Stuffed Potato
Scalloped Cabbage with Cheese
Egg Ring Salad with Boiled Dressing
Bread and Butter
Hermits Fresh Sliced Peaches
Milk

Approximate composition and caloric value: carbohydrate, 305 grams; protein, 90 grams; fat, 102 grams; bulk, 900 grams; calories, 2498.

5

Breakfast

Sliced Peaches
Wheatena with Milk and Sugar
Omelet with Currant Jelly
Wheat Muffins and Butter
Coffee with Cream and Sugar
Orange Juice

Dinner

Vegetable Soup
Roast Lamb and Mint Sauce Mashed Potatoes
Buttered Onions Small Peas
Orange and Grape Salad with French Dressing
Bread and Butter
Ginger Bread with Whipped Cream
Tea with Sugar

Supper

Braised Sweetbreads with Mushroom Sauce
Creamed Potato Buttered Italian Squash
Bread and Butter
Red Raspberries Sugar Cookies
Milk

Approximate composition and caloric value: carbohydrate, 315 grams; protein, 90 grams; fat, 105 grams; bulk, 800 grams; calories, 2565.

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6

Breakfast

Stewed Prunes
Puffed Rice with Milk and Sugar
Poached Egg on Toast
Melba Toast Butter
Coffee with Cream and Sugar
Orange Juice

Dinner

Cream of Corn Soup
Baked Halibut
Parsley Potato Sliced Tomato
Lettuce Salad with French Dressing
Fruit Sherbert Wafers
Tea with Cream and Sugar

Supper

Cheese Souffle
Baked Potato Fresh Spinach
Combination Vegetable Salad with Boiled Dressing
Bread and Butter
Fresh Strawberries
Milk

Approximate composition and caloric value: carbohydrate, 270 grams; protein, 80 grams; fat, 90 grams; bulk, 800 grams; calories, 2210.

* * *

7

Breakfast

Melon
Pettijohns with Milk and Sugar
Bacon
Toast and Butter
Coffee with Cream and Sugar
Orange Juice

Dinner

Split Pea Soup
Lamb Stew with Vegetables
Boiled Potato
Stuffed Prune Salad with Cottage Cheese and Whipped Cream
Bread Pudding with Fruit Sauce
Tea with Sugar

Supper

Baked Beans
Spanish Pickles Fresh Spinach
Orange and Grape Salad with French Dressing
Corn Bread Butter
Baked Apple
Milk

Approximate composition and caloric value: carbohydrate, 270 grams; protein, 80 grams; fat, 90 grams; bulk, 900 grams; calories, 2225.

8

Breakfast

Grapefruit
Shredded Wheat with Milk and Sugar
Scrambled Egg
Toast and Butter
Coffee with Cream and Sugar
Orange Juice

Dinner

Fresh Fruit Cocktail
Chicken Broth with Rice
Broiled Chicken Mashed Potatoes and Gravy
Buttered Asparagus Celery Hearts
Small Peas Olives
Pineapple Sundae and Cake
Coffee with Sugar

Supper

Boiled Rice
String Beans Baked Tomato
Tuna Salad
Hot Biscuits and Butter
Apricot Whip
Milk

Approximate composition and caloric value: carbohydrate, 270 grams; protein, 80 grams; fat, 90 grams; bulk, 800 grams; calories, 2200.

* * *

9

Breakfast

Rhubarb
Cream of Wheat with Milk and Sugar
Liver and Bacon
Toast Butter
Coffee with Cream and Sugar
Orange Juice

Dinner

Vegetable Soup
Roast Beef Potato Cake
Buttered Celery Cole Slaw Creamed Carrots
Bread and Butter
Stuffed Baked Apple
Tea with Cream and Sugar

Supper

Jelly Omelet
Buttered Peas Braised Lettuce
Pineapple and Cottage Cheese Salad with
French Dressing
Bread and Butter
Peach Compote
Milk

Approximate composition and caloric value: carbohydrate, 310 grams; protein, 95 grams; fat, 100 grams; bulk, 900 grams; calories, 2520.

* * *

10

Breakfast

Orange
Shredded Wheat with Milk and Sugar
Broiled Ham
Toast with Butter and Jelly
Grapefruit Juice with Lemon
Coffee with Cream and Sugar

Dinner

Cream of Celery Soup
Swiss Steak Baked Sweet Potato
Sliced Tomato
Pear and American Cheese Salad with
French Dressing
Bread and Butter
Tapioca Cream
Tea with Sugar

Supper

Chicken Souffle with Mushroom Sauce
Baked Potato Egg Plant
Asparagus Salad with French Dressing
Bread and Butter
Sponge Cake
Milk

Approximate composition and caloric value: carbohydrate, 290 grams; protein, 100 grams; fat, 110 grams; bulk, 800 grams; calories, 2550.

Supper menus may be substituted for luncheon menus.

* * *

DISCUSSION

LYLE G. MCNEILE, M. D. (523 West Sixth Street, Los Angeles)—Doctor Sansum's paper is a safe, sane outline of a subject regarding which the average physician knows very little, and is apt to be too busy to apply what he knows. The habitual use of cathartics, as outlined, is one of the great crimes of medical practice. I am glad that Doctor Sansum has called attention to the rôle of focal infections in the cause of toxemias of pregnancy, and to the importance of the removal of such foci, together with dietetic treatment, as a rational means of properly controlling the toxemia.

❀

TITIAN COFFEY, M. D. (1136 West Sixth Street, Los Angeles)—The question of interest to us is the bearing of diet on pregnancy and lactation, especially in relation to weight.

Never should a woman be more careful of her diet than during pregnancy.

After the initial stage of vomiting and nausea and after passing the fourth month, a sense of well-being takes place, and to make up for the sometimes rapid and severe loss of weight coincident with the vomiting, the appetite improves and patients are apt to complain of ravenous hunger. This stuffing process leads to rapid gain in weight, frequently as much as six or ten pounds per month. Allowing an average gain of three pounds per month or twenty-five pounds during pregnancy, this starts them off with a bang and by the sixth month they may be way over the normal weight standard and dieting becomes necessary to control or reduce.

If the mother is to go through her confinement with safety and provide a sufficient quantity of milk, her weight should be kept within reasonable limits and one should not put on over fifteen pounds nor exceed this amount over the normal, according to standards based on age and height. All the dangers of physiological break during the last months are increased by excessive weight, and fat women are poor milkers. The thin, wiry woman is usually the one with the abundant milk supply.

Supervision of the diet therefore becomes of utmost importance on this account alone, regardless of handling the problems of high blood pressure, cardiac decompensation or kidney involvement.

Diet in pregnancy should be well balanced, rather low in proteid, with diminished fats if weight is being put on too rapidly and should consist largely of vegetables, fruits and salads, using eggs and meat sparingly with suitable restrictions or omissions in face of kidney breakdown.

During lactation fluids should be given freely, but too frequently we have found the mother deriving all the benefit apparently, by losing her figure and not manufacturing a sufficient milk supply.

Three square meals a day of plain wholesome food, avoiding all rich and spicy foods, is frequently of greater aid in lactation than the quantities of liquid our patients are often forced to take.

Printed diet slips as Doctor Sansum suggests should be given each patient and instructions given verbally as to the importance of diet to the mother.

Dieting to control the size of the baby is futile, but to preserve the welfare of the mother is vital.

❀

FRANK W. LYNCH, M. D. (University of California Hospital, San Francisco)—Doctor Sansum's paper re-

views in a clear manner the principles which underlie the use of diet as a means of treating many of the disturbances that are frequently encountered during pregnancy and that are characterized by acidosis. The essayist emphasizes the fact that the diet which usually appeals to individuals able to afford it is composed of foodstuffs whose residue contains acid ash which, even without concurring factors, favors the development of an acidosis which if long continued will cause definite pathological lesions which may prove of serious character.

A paper like Doctor Sansum's would prove of great interest to the majority of physicians in general practice even if it were designed as a general health measure for adults in general and had not been written specifically for the care of pregnant women. Physicians in general have comparatively little accurate knowledge concerning the possibilities of dietary treatment unless they have become interested in the actual details of the care of diabetic or nephritic patients. They welcome the appearance of any clear-cut paper giving detailed instruction in dietetic problems, especially if it emphasizes, as does the paper under discussion, the laws which underlie the treatment.

The value of the paper is greater since it deals with pregnancy, in which it is likely that some degree of acidosis is present constantly, resulting at first while the maternal body is struggling to become acclimated to the rapidly growing fetal cells, and later because the delicate metabolic balance is upset by dietetic errors, infections, etc., which may throw the patient into the condition now termed toxemia of pregnancy. Naturally this phenomenon is seen more often in individuals whose threshold of resistance is more narrow than normal, a condition which may not be recognized until the kidneys which had hitherto been functioning normally break down under the added strain imposed by pregnancy. Proof of this is afforded by the well-known facts that an ether anesthesia of one hour and a half given for a simple laparotomy may throw a pregnant woman with a mild toxemia into a fulminating type, and that pregnant women who have gained weight unduly rapidly more readily pass over into toxemic conditions than do those whose weight gain is slower and more uniform. Clinical evidence gives much support to the theory that pregnancy is in reality a "delicate state."

It is most reasonable therefore to use diet as one of our chief means of treating the toxemias of pregnancy that are characterized chiefly by an acidosis. The treatment is logical because kidneys, the chief organs of excretion, are easily injured when they are called upon to handle excreta which has not yet been converted into the blandest form. The experience of the medical world shows that the treatment of this type of case by drugs has been a conspicuous failure in spite of the fact that the patients as a group have youth on their side. In marked contrast is the conspicuous success which has attended the treatment of nephritis, diabetes, constipation, acute ulcers of the stomach, etc., by therapeutic measures in which diet assumes a leading rôle.

Doctor Sansum's paper to my mind is thoroughly sound and constructive and presents a method of therapy that will be even of greater interest in future time. It is in conformity with modern biological chemical study and the clinical experience of nearly all physicians who have been treating this type of patients along these lines. The dietary tables should be of great practical value.

I hope that the author will incorporate in his discussion the method which he advocated for estimating the acidity of the urine.

❦

Doctor Sansum (closing)—The reaction of the urine may easily be determined by means of dyes which are called indicators. Pieces of paper dipped in the dye, litmus, have been used for this purpose for a long time. This dye has the property of turning red in an acid solution and blue in an alkaline solution. The dye, litmus, however, is not a very delicate indicator; in fact I believe that a urine which is acid enough to turn blue litmus paper to red is far too acid, and a urine which is alkaline enough to change red litmus paper to blue is probably too alkaline. More delicate dyes, Brom Thymol Blue and Methyl Red, have therefore been chosen.

There is an excellent book entitled "The Determination of Hydrogen Ions" by W. Mansfield Clark, published by the Williams and Wilkins Company, Baltimore, which contains full details.

The dyes chosen have the advantage of changing to several colors, depending upon the degree of acidity or alkalinity. The dye, Brom Thymol Blue (B. T. B.), is yellow in a slightly acid solution and blue in a slightly alkaline solution. As the reaction changes from acid to alkaline the color changes gradually from a yellow green to a green, to a blue green, and finally to a blue. The dye Methyl Red (M. R.), is used in the more acid urines. In the extremely acid urines it is yellow with varying shades of color between.

The material used for the test:

1. Two small test tubes.
2. Two dyes. Brom Thymol Blue (0.04 per cent) for the less acid urines and Methyl Red (0.2 per cent) for the very acid urines.
3. Color chart.
4. Medicine dropper.
5. Distilled water.
6. Specimen of urine to be tested. This should be a part of a twenty-four-hour specimen, but single specimens may also be tested.

A medicine dropper full of urine (it need not be measured accurately because the dye expresses the ratios between the alkaline and acid components of the urine rather than the total amount of either) should be placed in a test tube, and for the first test, four drops of Brom Thymol Blue are added with enough distilled water to nearly fill the test tube. The shade of color should then be compared with the Brom Thymol Blue color plates in daylight. The green-blue shade marked 2.2 above, (pH 7) below, is, I believe, the ideal shade, but the shades marked 3.5 (pH 6.8) and 5.6 (pH 6.6), do not indicate very acid urines. If with this indicator the shade is yellow, another test tube should be used as before except that two drops of Methyl Red should be added and the shade compared with the Methyl Red color plates. None of these degrees of acidity are satisfactory, but they express the net result of the ash of the diet and should warn patients to change their diets radically toward the alkaline side.

THE TREND OF GASTRIC SURGERY*

By John Homer Woolsey, M. D.
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Discussion *by Donald C. Balfour, M.D., Rochester, Minnesota; Wallace I. Terry, M.D., San Francisco; Burns S. Chaffee, M.D., Long Beach.*

GASTRIC surgery originated because of mechanical block from disease. Later pathology of certain lesions became the influencing factor. Today physiology is uppermost in the surgeon's mind. Retzius, Volkmann, Aschoff,[1] and Waldeyer observed and demonstrated the anatomical arrangement of the folds of the stomach along the lesser curvature directing the food by a quite definite course to the pylorus. Ninety per cent of the gastric ulcers and the great percentage of the malignancies occur in this great gastric pathway, the Magenstrasse. Continued irritation from the passage of material along this pathway interferes with the healing of an abrasion or injured area so located. In contrast to this location

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